July / August 2014

In this issue:

1. High Precision Surveying at the Smithsonian Environmental Reserach Center (SERC)

This past summer, Heather Nicholson, a 2014 NOAA Hollings Scholar and surveying engineering student from Penn State University, successfully ran a first order, class II digital barcode leveling survey, bringing high precision elevations (North American Vertical Datum of 1988, or NAVD 88, orthometric heights) from existing, published NGS bench marks into SERC property. Accurate elevation information was previously unavailable at SERC, and the new information can now be used by numerous researchers. The level line terminates at SERC's long term tide station along the Rhode River by Edgewater, Maryland, which adds value by providing the opportunity to connect terestrial and water level datums.

The project involved all stages of surveying, from field reconnaissance and survey planning to mark setting, leveling, mark descriptions, data analysis, leveling adjustment, and ultimately, the production of a detailed survey report and the publication of a new level line in the NGS database: L28132, Part 1. This project was in direct support of the Smithsonian's new Tennenbaum Marine Observatories Network (TMON) and the Chesapeake Bay Sentinel Site Cooperative. NGS ECO plans to build on this initial work by extending the level line into SERC wetland sites, including the enhanced-CO2 project site at the Kirkpatrick Marsh, thereby enabling SERC researchers to derive accurate estimates of wetland elevation capital and its relation to local tidal datums.

2014 Hollings Scholar Heather Nicholson (foreground) operating a digital barcode level rod at SERC. Kind assistance provided by SERC employee James Duls (in background)

2. An inexpensive leveling technique shows promise for monitoring wetland elevation change

Molly Cain, a 2014 NOAA Hollings Scholar and geosciences major at Penn State University, recently completed an investigation comparing Surface Elevation Table (SET) measurements of wetland surface elevations to a new, inexpensive digital barcode technique. The fundamental driver for the project is a growing need for coastal managers to monitor coastal wetland elevation change with respect to changing local water levels. The SET, an instrument designed by researchers interested in understanding processes of wetland soil development, typically measures elevation change in a spatially limited plot (about two squared meters). Although the SET is reported to have the ability to resolve elevation change on the order of a few millimeters, the high cost of establishing a plot (akin to a deep rod mark) and the limited spatial extent represent significant challenges for its widespread use in monitoring elevation change across spatially extensive wetland areas such as in a coastal park, refuge, or reserve.

Ms. Cain's project investigated how an inexpensive digital barcode level technique could potentially extend the scope of SET-like measurements over a hectare or more, across many different marsh types. The study included sites across the Chesapeake Bay region, from the tidal fresh marshes along the Patuxent River to salt marshes at Assateague Island. Her results show that except for very unconsolidated/"soupy" sediments (Patuxent River), the leveling technique compares very well to the SET. Ms. Cain is continuing to work on her project over the fall semester, with the goal of publishing her results in a scientific journal; her poster has been accepted at the 2014 Geological Society of America conference in Vancouver, B.C.

2014 Hollings Scholar Molly Cain surveying the marsh at Assateague Island.

3.NGS ECO assists the National Park Service (NPS) with leveling to the new Chincoteague tide station

In the last ECO Newsletter, you read from contributing author Neil Winn about the installation of the new Chincoteague Island tide station. The next task towards making the unit operational was to provide a high accuracy (vertical) leveled connection between the tide gauge and a network of newly installed tidal bench marks. The week of July 14, Heather Nicholson, fresh from completing the leveling survey at SERC (see item (1), above), helped make the leveled connection and instructed NPS personnel in the operation of a Zeiss/Trimble digital barcode level according to NGS procedures. As a result, the new tide gauge one step closer to becoming operational, and the staff at Assateague Island are now fully capable of running level lines to NGS standards.

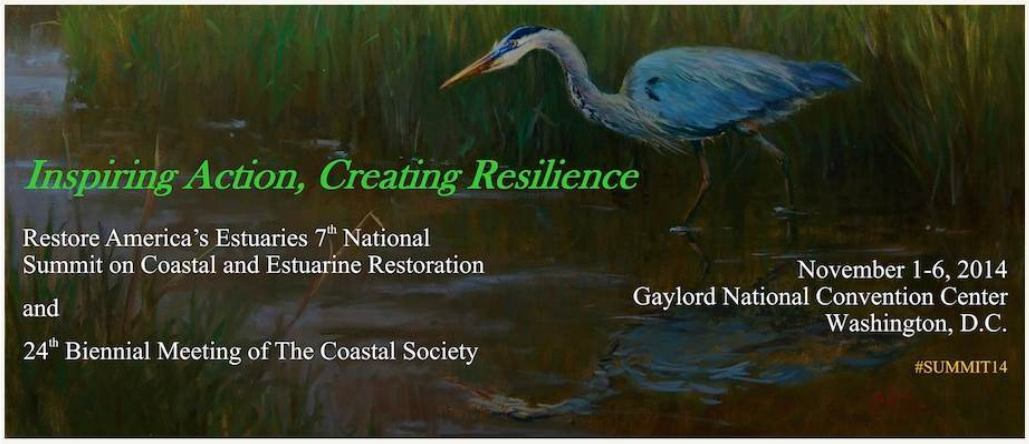
Heather Nicholson (NOAA Hollings Scholar; left) and Neil Winn (National Park Service; right) surveying at Chincoteague, VA.

4. NGS to conduct field trial of new river crossing procedures

The week of September 22, a team from the NGS Instrumentation and Methodologies (I&M) Branch will conduct a field trial of river crossing procedures using the latest, high accuracy (half second) robotic total station technology. The new procedures based on total stations have been recently developed and tested at the Corbin, VA I&M facilities: NGS has agreed to test the procedures under field conditions at Maryland's Ocean City inlet. The experiment will strive to provide a high accuracy vertical connection between the tidal bench marks supporting NOAA's Ocean City tide station to new marks set across the inlet on Assateague Island. This connection will allow bench marks on Assateague to be connected, via leveling, to the Ocean City tide station, improving the known relationship between geodetic and tidal datums at those locations. This effort provides meaningful assistance to our National Park Service partners and will also support the doctoral dissertation of Galen Scott, who is planning to conduct his investigations into sentinel site geospatial infrastructure and methodologies at Assateague Island.

5. Chesapeake Bay Sentinel Site Cooperative will chair a session at 2014 Restore America's Estuaries Meeting

The Chesapeake Bay Sentinel Site Cooperative (CBSSC) will chair a dedicated session at the Restore America's Estuaries conference on November 4 in Washington D.C. This will be a wonderful opportunity to share the Cooperative's efforts with this important national audience. Philippe Hensel will highlight the CBSSC's contributions to a comprehensive surface elevation table (SET) metadata inventory. There will also be site specific presentations: Pati Delgado will introduce the sentinel site infrastructure that has been installed at Jug Bay, Maryland; Laura Mitchell will share lessons learned after collecting a series of real-time-kinematic datasets along vegetation transects at Blackwater National Wildlife Refuge; and Linda Blum will explain the experimental design aimed at re-planting previously inundated agricultural fields at the Virgina Coast Reserve, Long-term Ecological Research Network. Finally, Chris Paternostro will highlight how tidal datum trainings and open-source software are increasing local capacity to analyze water level data.



6. In case you missed it!

- From our IOCM friends (Integrated Coastal & Ocean Mapping):
    - The Annual NOAA IOCM Retreat is on Sep. 11 and 12th for NOAA offices to share what they do, explain their milestones and the status of those milestones. It is also a venue for NOAA offices to share what mapping activities they are planning for FY15 and on as well as discuss collaboration opportunities. This retreat is an internal retreat for NOAA offices. Information on NOAA IOCM can be found on the following website: http://www.iocm.noaa.gov/iocm.html

    - The 2014 IWG-OCM retreat is Thursday Oct 2nd at NOAA Headquarters in Silver Spring. IWG-OCM is the Interagency Working Group on Ocean and Coastal Mapping. It is the subcommittee on Ocean Science and Technology (SOST). SOST serves as the Ocean Science and Technology Interagency Policy Committee under the National Ocean Council. This interagency working group seeks to avoid duplication of mapping efforts and facilitate the coordination and leveraging of mapping resources. As a first step in 2007 the IWG-OCM began the development of a comprehensive ocean and coastal mapping data and activities inventory. Over the years the working group has been working on the design and implementation of the inventory. Mapping agencies such as NOAA, USGS, and USACE have participated since the inception of this working group and other participants such as NSGIS and CCOM-JHC have also been involved. The IWG-OCM retreat is for IWG-OCM members only however information on the OCM inventory is available on the IWG-OCM website.

- Earl Meredith, the new Chesapeake Bay Sentinel Site Cooperative Coordinator (introduced in the last edition of the newsletter), has successfully spun up a "built infrastructure" sentinel site working group, featuring many of the big names in the Chesapeake Bay climate change adaptation and sea level rise and inundation modeling. Currently, the group is developing a pilot project concept, with the aim of completing a project in 2015.
- Three of the National Ocean Service's offices (National Geodetic Survey, Center for Operational Oceanographic products and Services, and the Office of Coast Survey) are teaming up to provide a three-part vertical datum training series to support its coastal partners, especially those involved in the NOAA Sentinel Site Program. The initial offering is a series of recorded, introductory webinars currently available online: http://www.ngs.noaa.gov/corbin/class_description/Geodetic_Tidal_Datums_0811.shtml On September 18, a call-in "ask the expert" webinar will allow the audience which has already reviewed the material to have questions answered. If interested in this webinar, please register at: http://www.ngs.noaa.gov/corbin/class_description/Conversation_Datums.shtml. In 2015, additional training is slated to address simultaneous datum comparison and tidal datums computation techniques using freely available water level processing software.

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